many sources being all thought fit to yield their share of the ice harvest.

Fortunately of late years, owing to the repeated failure of the ice-crop, the larger cities in the east are mainly supplied with "artificial" ice. This ice, being formed as it is in the greater number of cases from the regular water-supply of the city, ceases to a large degree to be a source of danger from organic contamination. There have been cases, however, and notably one which fell under my own observation, where an ice company, advertising their ice as made only from pure distilled water, produced daily for some weeks beautiful cakes of crystalline ice, the centre of each cake a rich, dark-brown, and actually giving forth an offensive odor! Some of these samples were sent to me for analysis, and the results were most startling, indicating rather a concentration of impurity, both organic and inorganic, than a distillation or purification. The cause was naturally looked for and found in the stills themselves, which were eventually overhauled and remodeled, with the result that finally a first-class high-grade ice was put on the market.

The necessity for an absolutely wholesome water-supply for the manufacture of ice is at once apparent, as in processes generally in use the entire contents of the water tanks are frozen, and all impurities contained in the water must needs enter the ice. The case referred to was interesting, showing as it did how the color and organic matter had been concentrated in the middle of each cake. The ice forming first at the sides had repelled these impurities until finally, with the freezing of the entire mass, they had of necessity been included.

ELEMENTARY SCIENCE IN THE PUBLIC SCHOOLS.

BY HENRY MONTGOMERY, PROFESSOR OF MINERALOGY AND GEOLOGY IN THE UNIVERSITY OF UTAH, SALT LAKE CITY.

MANY years' continuous service as a teacher of young men and women, in a measure, unfits one for acting as an instructor of children. I do not say that a teacher of children requires greater or higher qualifications than a teacher of college students; but the qualifications must be different. One who aspires to be a teacher and leader of students of advanced subjects as taught in colleges and universities ought to have good mental faculties, and these ought to be in a high state of cultivation. With the increasing intricacy and complexity of the studies come increasing difficulties for the students. These difficulties must be recognized and dealt with by the instructor. Hence the successful university teacher must be possessed of teaching powers suited to the minds of students of the advanced branches in which he undertakes instruction. Both the character of the studies and the mental condition of the students of the university differ widely from those of the pupils of the common school. Consequently the teachers of these two classes of pupils must differ widely as to qualifications. Between the primary or common school, on the one hand, and the university, on the other, comes the secondary or high school, which, of necessity, must be supplied with teachers of somewhat different qualifications. The high-school teachers must be adapted to the work of instructing pupils of certain attainments and generally of a certain average age, which stand between the common school and the university. A still more satisfactory grading is effected by classifying all pupils in five divisions, viz., the kindergarten, the common school, the high school, the college, and the university; and in these, especially in the common school, a further grading often proves beneficial. It has many times been found that one who has succeeded well teaching a class in some branch in the common school, has not succeeded as a teacher of a lower class or a higher class in the same branch and in the same school. We all know that a child will voluntarily leave other children that may be older or younger than himself, and seek out those of his own age, or, rather, of his own mental attainments; and, again, on reading a story to a child of nine years no interest is awakened, while on reading the same to another two or three years older or younger the most lively interest and appreciation of it are immediately manifested. The first thing, then, to be considered in the teaching of science is the stage of the development of the faculties of the child. Let this be first diagnosed, and then let no mistake be made in prescribing the kind of material suited to his condition, and the character of the methods of instruction to be employed in his particular case.

To the question, Should science be taught in the public or common schools? I answer in the affirmative. Most decidedly, yes. Which of the sciences? Should it be chemistry, or physics, or zoölogy, or mineralogy, or botany, or physiology, or geology? I answer, all of them as one subject, the study of nature. Specialization, differentiation, or the division of labor, characterizes civilization. It is forced upon us in the higher studies. This is simply a matter of necessity, due to the vastness of the fields of higher learning, the shortness of life, and the limits of the human mind. But, it is possible to specialize only in the maturity of manhood and womanhood. It is not possible in childhood. The youthful mind is not capable of such work. The young mind is not able to fix attention or concentrate thought upon a subject, and particularly if the subject be studied in an isolated and disconnected manner. Add to this a method that is both systematic and abstract and the avenues to learning are completely closed. In very early years, say before the age of eleven or twelve, the average child cannot readily or profitably study anything in an isolated, a systematic, and an abstract manner, and he can do it but very feebly at this age. The study of a subject systematically by classification, the study of the abstract, and the cultivation of the reasoning faculty should not be attempted early. Nature rebels against it. It is the faculty of perception which appears first. This is the faculty which should receive the attention of the teacher of children. To the cultivation of observation, expression, and memory, along with the full physical development of the child, all the best energies of the teacher should be given. It is not a question, then, of dividing and classifying the natural and physical sciences, and choosing one or more of them to be placed on the curriculum of schools. This is necessary and proper in the later years of the high-school courses, and in the higher institutions, but not in the common school, or to any great extent in the lower classes of the high school. System, method, and classification in study are exceedingly important for matured persons; but, they do not belong to early life. As soon as the mind is prepared to undertake such work, it should be begun; and it should be increased very slowly, gradually, and almost imperceptibly. I repeat it, common-school pupils ought not to be taught zoölogy as a distinct science, nor botany, nor physics, nor geology as such. All systems of classification, even to the division of these sciences, are artificial. Chemistry, physics, mineralogy, botany, zoölogy, physiology, and geology should not be separated. These sciences come naturally together; and, therefore, they are most readily understood and remembered when studied in this way. Let the child see the fish swim in the water, the bird fly through the air, the duck swim and sail on the pond, the river erode its banks, the waves beat and grind the pebbles against one another on the beach. Let him be led to use his senses in observing the soil, clay, sand, gravel, grasses, trees, flowers, butterflies, beetles, worms, crops, streams, hills, ravines, bees, squirrels, ants, crickets, birds, snow, rain, stones, rocks, and fossils, just as they occur in nature. In any case, even to adult persons, the associations are of vital significance. Many a time it happens that a mineral sample, a bit of rock, or a fossil, by itself is of but little use in helping us to understand some question of moment. Again, an extract from a book may be unintelligible or ambiguous. But, in the one instance, permit us to see the associated minerals and rocks in position, and, in the other, to read the context, and what a flood of light is let in upon us! The relations that objects of the three kingdoms of nature bear towards one another are of the utmost importance. But, in addition to the importance of the associations and relations, the ease with which children are enabled to comprehend the characteristic structure, habits, and uses of anything when studied as it occurs in nature, is something the teacher and parent cannot afford to ignore. An old-fashioned method of teaching orthography consisted in compelling the pupil to learn a column or a page of isolated words chosen with reference to the number of syllables they contained. Some of these words were extremely rare; many of them would not be

used by the pupil in speaking or writing, or met with in reading, for several years afterwards, and all of them were completely separated from the other words requisite to constitute any sentence. This was an unnatural method, and, it is needless to say, an unscientific method. By exercises in composition, and also by means of dictation exercises, i. e., a careful selection from an interesting story or history, suited to the capacity of the pupils, and with just enough new words and idioms in it to ensure progress, orthography is taught scientifically. By this means the child sees the relations of the words, understands their uses, and so more easily remembers and uses them. Thus it is in the teaching of science to children. Is it not true that natural and physical science is even now taught in many of the schools of the United States in very much the same manner as spelling was wont to be taught in olden times, in a disconnected, detailed, and unnatural way? But, it may be objected that the curriculum is already loaded with studies, and, therefore, there is not room for all the sciences on the common-school programme. My reply is, that in place of increasing the load I would actually lighten it. Requiring elementary, practical, concrete, object-instruction in nature does not imply an increased amount of work. The sum total does not need to be greater. If demanded in the interest of health, the total amount should be lessened. But the work should be natural; and, being more natural, it will, of course, be lighter and more acceptable. The study of nature is pre-eminently that which cultivates observancy, and accordingly comes first. Yet, it cannot be taught without a language; and the language in this country must be the English. Writing, spelling, reading, grammar, composition, drawing, geography, and arithmetic can all be taught while giving instruction in the natural and physical sciences. In fact, the teaching of science to children implies practice in drawing, writing, oral composition, written composition, and a certain amount of arithmetic. An afternoon's, or, better still, a forencon's ramble over the fields, up a canyon, upon the side of a mountain, or along the shore of a lake or bank of a river, or a visit to a good museum, will ordinarily afford abundance of material and opportunity for penmanship, letter-writing, drawing, measurement, calculation, and oral and written language lessons.

Hence, it is plain that it is not a specialist in any particular branch of the sciences who is needed to teach children. The teachers should be chosen with reference to their fitness for teaching children of a certain stage of mental development. This is the natural standard. It is not really necessary that the teacher have a college education, or a knowledge of the advanced studies. But, it is absolutely necessary that the teacher be possessed of good common-sense, be able to see clearly the things around him, be accurate as far as his work extends, and be full of love for that work. There is a little book entitled "Directions for Teaching Geology," by Dr. N. S. Shaler, professor of geology in Harvard University, which ought to be in the hands of every common-school teacher. After an experience of twenty years, teaching all grades of students, Dr. Shaler expressed himself as follows: "It seems to me very desirable that the first steps of the child in the study of the physical world should be given by teachers who give the beginnings of the other branches of learning. Although it is held by some students of the problem of science-teaching that the work must be done by special teachers of science, I am inclined to believe that the view is a mistaken one. The special teacher will have to divide the intellectual life of the student, and in the infantile stages of this education it is difficult to make this division."

As to methods of instruction in elementary science, the judicious use of books, pictures, charts, maps, and models is proper. But the instruction should be largely by open-air excursions of two or three hours each, and taken twice or thrice a week. It can easily be accomplished in most places throughout the greater portion of the year. Of course, in inclement weather the instruction must be given in the schoolroom. It is there the material collected by the teacher and pupils in their rambles may be examined and studied. The schoolroom may serve the good purposes of a shelter, and a place for exercises in description of the excursions and of the specimens gathered. It should also be used for the inspection and study of manufactured articles, which are, of course, the products of scientific industry. These exercises should be varied. Oral questioning is useful. Written descriptions are still more useful. Drawing is of great service as an exact form of expression; but much care should be taken to prevent it from becoming merely a mechanical exercise and thus interfering with true inspection. This indoor work is especially useful for reviews. In reviews, the memory becomes trained and strengthened; and let it not be forgotten that the memory ought to be trained and strengthened. Memory is an important faculty. I have no sympathy with the modern tendency to despise memorizing. I believe strongly in the cultivation of the memory. What would man be without a memory? As a matter of fact, I know of nothing that hinders and cramps my teaching more than the lack of a strong, full, retentive memory on the part of the student. Often it is with difficulty he can recall the meaning of words in his text-books. He cannot follow me because he has forgotten the significance of many of the words, English as well as technical, used in the lectures or explanations. For the same reason, many times he omits taking notes, or else he causes delay by stopping the instruction in order that whole sentences may be repeated for his benefit, his memory not being strong and active enough to grasp and retain more than a very few words at any one time. Why should so many young people enter college at the age of sixteen or seventeen with weak and leaky memories? If the question had reference to the reasoning faculty, it could be satisfactorily answered, inasmuch as reason appears later than memory, and has not had time for development. But, the memory can and should be developed in the primary and secondary schools, and the study of nature is eminently adapted to this development, as it is also to that of comparison. I am disposed to think the high schools might do much more in this direction by wisely conducted examinations upon large portions of the work. I say "wisely conducted;" for I know there are examinations that are not wisely conducted, and such would not produce the desired result. It is not enough for a young man to tell me that he knew a subject one or two years ago. If I wish to engage him to do a certain kind of work in which a knowledge of that subject is required, I wish to ascertain what he knows about it now, and whether he can use it now. Discipline of the mind is one thing, and practical knowledge is another. True education must include both. A student may shine in the class-room day by day; yet he may not be able to pass a good examination or even a fair examination on the whole year's work. He does not possess that particular kind of power which will enable him to hold a year's work. This faculty should be recognized and improved.

With reference to the mode of instruction by frequent excursions, that the young people may, under a competent guide, get a first-hand kuowledge of nature for themselves, allow me to call attention to an article from the pen of Dr. J. M. Rice, which appeared in a recent number of the *Forum*. In the article referred to Dr. Rice sketches the work he saw done in primary schools in Germany and New York during his visits to both. He commends the German method by field-excursions as being scientific, and condemns the American method, or that which he witnessed in New York City, as being unscientific. The contrast between the two systems is very forcibly brought out. Dr. Rice concludes his interesting article in these words: "If life be made a burden instead of a pleasure to the child, the blame falls upon those persons who fail to place their children in the hands of individuals who know how to educate them without destroying their happiness." This I take to be an appeal from Dr. Rice, not to a few persons, but to the American people at large, to free their children from the evils of a close-confining, hot-house, mechanical system of primary education. Doubtless in many instances the teachers are to be pitied rather than blamed. Assuming them to be qualified and reliable teachers, desirous of taking the little ones out for study, the principal, if there be one, or the superintendent, may possibly object; perhaps some members of the board may object, or the children's parents may offer opposition. Under these circumstances, what are the teachers to do? Simply stay shut up in the school-house during the finest weather, and

be obliged, four or six hours a day, to teach, as best they can, perhaps without maps, globes, charts, models, pictures, or any other appliances of a proper sort. This would be somewhat bearable, aye, even profitable, were the pupils sixteen to twenty years old. But it is a terrible thing for children, and a terrible thing for their teacher, to be expected to endure. Such teachers and children have my sympathy. I sincerely pity them. Think of trying to hold in quietness and attention in a schoolroom, for hours at a time, forty or fifty children, whose tender, growing bodies and minds call loudly for air, for sunshine, for exercise and freedom! What is the use of talking about teaching science so long as in our very attempts to teach it we continue to act in opposition to the laws of nature? A striking example of this inconsistency occurred some years ago in a well-known eastern university. While the professor was lecturing on hygiene, one of his students fainted for want of pure air, the room being closed up and utterly destitute of ventilation. With the view of enlarging and improving the facilities for elementary science instruction, permanent collections might be made in every school. But really good collections, kept in proper order, cost a great deal, and, consequently, must be few in number. Good museums in cities might be made highly useful to all the common-school children within easy reach of them. They would be a relief to all in winter, and they would at all times be useful to those whose school buildings might chance to be situated near the centre of a large city and at an inconvenient distance from the fields and hills of the open country. Especially should we expect the State university museum to be made convenient, attractive, and instructive to all grades of young and old students. All parts of our public educational system should be consistent and in harmony. If a university can be equipped in such a manner that visits to its museum and inspections of its collections may be a source of pleasure and instruction to the pupils of the public schools of the State, or even any considerable part of the State, it will surely be so much the better. Well-arranged, well-labelled, and well-lighted university museums may and should serve as great educators of common-school pupils, as well as of the general public, who may visit them from time to time. In California, and at least one or two other States, the express companies carry specimens for the State universities free of charge. In New York State and some other places, the students in training at the State normal schools are required to pay only half the railroad fare to and from these schools, although many of them travel several hundred miles to reach them. A number of the eastern and northern States have for some time been furnishing free text-books for the public schools; and, in Ohio, not only are free text-books provided for the school children, but the State legislature has also taken measures for the supply of clothing for the pupils where it may be necessary. Now, as before stated, museums of any great value or importance must be few. They are too expensive to be numerous in an ordinary State. They cannot be transported from town to town. Why shonld not some arrangement be effected by which pupils of school age, and in regular attendance and full standing in the schools, and their teachers might receive free railway transportation at least once a year to and from the State university museum? Knowing what is done for public schools by a few large museums, I am of opinion that greater efforts should be made in this direction in all the States, and also that strong efforts should be made to better the university collections, keeping in mind the necessities of the public schools.

Were I asked for other advice regarding methods of teaching elementary science, I would say, that the pupils should be started with the study of the familiar, that which is most readily observed and best known. The subject matter should consist of common things, and the language of the teacher should be simple and intelligible to the pupil. Some twelve or fifteen years ago the distinguished scientist, Professor Huxley, published a book on practical biology, in which he adopted and advocated the system of study by which the student begins with the lowest and simplest forms of life and proceeds to the higher and more complex organisms. Owing to the fact that the lowest living beings are microscopic and obscure, this was altogether unnatural and unscientific. Yet, because Huxley adopted it, almost every teacher of biology, in English-speaking countries, adopted it too. Within a few years it became evident that (except with advanced and well-trained students) the results were far from satisfactory; and, accordingly, in the preface of a later edition of the book, Professor Huxley writes that experience has shown that the order ought to be reversed, and that henceforth the student should begin with those forms of life which are somewhat familiar, and proceed to those less known.

In the next place, I would warn the primary teacher against teaching the details of any subject to very young children. Unwise choice of material, and the forcing of a heap of details upon children, correspond closely to the old system of teaching spelling by selecting long and very rare words. This far-fetched material should never be used in primary teaching. Only the more conspicuous and general characters, uses, etc., should be dwelt upon, unless, in very exceptional cases, where, for some good reason, the child may appear to be profited by a minute account of any animal, plant, or mineral. In all cases, the details are most out of place when there is no object of the kind present. As far as possible, the teacher should keep close to the wishes and inclinations of the child in the choice of subject matter, and work along these lines, so long as there seems no good objection to his wishes. With high-school pupils, I would recommend the frequent use of the microscope. In the hands of an intelligent teacher, this instrument may be used to advantage with small classes of pupils, say, above thirteen years of age. A stereopticon or projecting lantern should often be used in all grades of schools. Certainly for a high school, no better investment can be made, and the common schools of any city might, by arrangement with the high-school teacher, who operated the lantern, become recipients of the benefits to be derived from the possession of this piece of apparatus.

A word or two with regard to physiology and hygiene. I consider that the teaching in these subjects should be greatly improved. I would not have a great amount taught; but, in several respects, it needs to be made more practical. Time will not allow me to expatiate upon these matters here. Yet I cannot refrain from directing attention to the fact that, for reasons of delicacy, three systems of organs of the human body, either partially or entirely, are invariably omitted from the course of instruction in all of our schools. For both moral and sanitary reasons, I am inclined to think something should be done, and that something will yet be done to provide for a wholesome, intelligent, and practical course in these subjects. It may be that at present little can be done; but I venture to suggest that where it is altogether practicable to do so, perhaps in some city high schools, the sexes receive instruction in these studies in separate class-rooms, and from capable and proper instructors. It would, of course, be absolutely essential that the instructors have properly constituted minds, and be especially qualified to speak to and deal with young persons, in order that good might come of their instruction. This is undoubtedly a difficult problem to solve. It must, however, be admitted that it is a very important one.

Again, the science teacher must have interest in the studies themselves. I have not much faith in the common, little, artificial devices for exciting the interest of the pupil. They are but the nostrums of quack doctors. They remind one of the application of ointment or salve to the external surface of the body to cure a disease which has its seat in impure blood or in a weak nervous system. They are not born of sympathy or interest in the study. The teacher should be interested in the studies as well as in the pupils. It is all right to desire to do good to the children, but there must in addition be a pleasurable enjoyment felt by the teacher in the prosecution of the study itself. In fact, interest in the study — a spirit of inquiry, of enthusiasm, if you will — is of the utmost importance. Teachers and pupils alike need it. Teaching must not be done merely for money; it must not be done in order to show one's knowledge. The pupil must not ask questions with the view of puzzling the teacher, or of showing his own learning or smartness. Too often do we get students who have been so praised and flattered by their previous teachers, that it is exceedingly difficult and sometimes impossible ever to do

anything for them. They are keenly disappointed at not being acknowledged as perfect in their studies, and are ever anxious to show their learning. It takes a long time to work them down to their proper level. Teacher and pupil should ever seek truth. They must come to their work in a spirit of earnestness, absolute honesty, candor, and sincerity, otherwise the work will be a failure. The really true teacher is an inspired man. He draws the pupils around him, because he is himself interested in his studies. Such were the great teachers of old, and if any of us now succeed in any measure as teachers, it is only so far as we possess interest and enthusiasm in our studies.

Frederic Harrison, with forty years' active experience in educational work, in writing of late, said: "I have for years past joined in the discussions and conferences on this question; and now I feel at times that we are further off the right path than ever, as if our whole system were a failure. There are hours when I feel about education nothing but this, — wipe it out, and let us begin it all afresh." This was written a few months ago with reference to education in England; but it was in relation to some of the very matters that are engaging our attention in this country at the present time. I cannot go so far as Harrison does in this expression of his opinion. I know the public schools of this country have done and are doing a useful and a noble work. The nation cannot do without them, nor can it afford to permit their usefulness to be impaired through lack of support and sympathy. Give them the support and encouragement they need and deserve, and they will be improved, and the country profited thereby. Honest and intelligent interest in the schools should lead to improvements in their condition. If changes in the system seem desirable, let them be made. Let neither prejudice nor individual selfishness stand in the way. It has more than once been stated by American educators of experience and high standing that science-teaching is difficult, and that there are few, very few, teachers capable of engaging in it. I fear there is much truth in this statement. Science, like any other subject of education, must be taught by a competent person. It is folly to expect proper results from persons who have not both the natural and the acquired qualifications of a true teacher, and it is much greater folly to expect them from those who have neither of these two qualifications. Teachers possessed of both are indeed rare; and how can we expect them to be plentiful so long as the trustees and boards of education, and the people behind the trustees and boards, remain satisfied with so low a standard? When the public come to realize that a higher standard of qualifications, mental and moral, on the part of the teacher, is absolutely necessary for the welfare of our country, when they come to have a heartier appreciation of high-class attainments, they will be willing to make adequate compensation for the teacher's labors and influence, they will seek teachers of longer and better training and experience, teachers who carry with them an atmosphere of a higher and a more inspiring character. I have hope that this time will come. Let us do what we can to bring about these conditions. For the sake of the youth of our land, for the sake of the material, the physical, the moral, and the intellectual advancement of our country, for the sake of everything that can contribute towards the promotion of the civilization of this great nation, let us earnestly pray that the dawn of that day may be hastened, that the free public-school system, which forms a net-work throughout the length and breadth of this Union, may, more truly and fully than ever in the past, yield those practical and beneficent results anticipated by its founders, hoped for by its friends, and rendered necessary by the foundation principles of the government of a free people.

NOTES AND NEWS.

A REPORT on the petroleum trade of the Caucasus has been sent to the Turkish Government by Aassib, the Turkish Consul-General at Tiflis, and some interesting extracts from it are quoted in the *British Board of Trade Journal*. The petroleum springs of the peninsula of Apcheron, not far from the place at present occupied by the town of Baku, were known, according to the writer, several centuries before the Christian era, and the phenomena produced by them, totally inexplicable in those barbaric ages, gave rise, he says, to the worship of the Guebres, followers of Zoroaster, which lasted into the nineteenth century, for the temple of the worshippers of eternal fire is seen to the present day. The springs of Balakhani are situated 20 kilometers from Baku on a bare and arid plateau, swept by the winds, at an elevation of about 60 meters above the level of the Caspian Sea. The petroleum lands occupy an area of about 8 kilometers. At the present time Balakhani and Sabountchi possess more than 1,000 wells, some of them newly bored, producing in twenty-four hours as much as 400,000 pouds. An era was marked in the history of the naphtha industry by the house of M. Nobel, which started at Baku in 1874, and in the following year purchased a small business and undertook the production of petroleum on a small scale. At that time the conveyance of petroleum to Baku was effected by means of carts and leather bottles. M. Nobel endeavored to show the absurdity of this primitive method of transport, and recommended that pipes should be constructed, but the majority of the merchants rejected the proposal. He then constructed the first pipe at his own cost, and demonstrated the utility of it to his colleagues, several of whom very soon imitated his example, and Baku has to-day a dozen lines of pipes, each of which cost more than 100,000 roubles. The same house, dissatisfied with the system of shipping petroleum in barrels, proposed to the Kavkaz and Mercury Navigation Company of the Caspian and the Volga that they should build tank-boats for the exclusive conveyance of petroleum. This proposal having been rejected, the firm constructed several of these vessels at their own expense. This innovation, of which even the Americans had not yet thought, was accepted by the two petroleum-producing countries, and tank-boats, the number of which is constantly increasing, are to be found on all the waters of the civilized world. It is also to M. Nobel that those gigantic reservoirs of iron which contain hundreds of thousands of naptha products are due. They are to be seen in large numbers at Baku, Batoum, and everywhere else where petroleum is carried in bulk. The series of innovations by M. Nobel do not stop there. With a desire to improve land-carriage he proposed to the Griazi-Tsaritsine Railway Company the construction of special tank-wagons for the transport of the petroleum, guaranteeing a load for them for several years. The railway authorities scoffed at the idea, and it was by the expenditure of very large sums that the Swedish merchant constructed for his own use the first tank-wagons. Scorn was immediately changed to enthusiasm, and to-day thousands of these wagons circulate on the railways of Caucasia and Griazi-Tsaritsine.

— The following appointments have been made at the Michgan Mining School: Dr. George A. König, late of the University of Pennsylvania, professor of chemistry; Edgar Kidwell, professor of mechanical and electrical engineering; Fred F. Sharpless, professor of metallurgy; Fred W. Denton, professor of civil and mining engineering. All these except Professor König have been connected with this school for several years as instructors, and have earned their promotion. Dr. Horace B. Patton has been appointed instructor in mineralogy and petrography; Dr. Alfred C. Lane, instructor in petrography and geology. These two have been connected both with the State Survey and with the Mining School for several years. Mr. Carroll L. Hoyt, a graduate of Cornell University in the mechanical engineering department, has been appointed instructor in drawing and mechanical engineering.

— A cuneiform tablet has been found at Tel Hesy, the ancient Lachish, by Mr. J. F. Bliss, who is excavating for the Palestine Exploration Fund. According to Prefessor A. H. Sayce of Oxford it contains the name of the same officer who is mentioned on tablets from Lachish, found some years since at El Amarna in Egypt.

— Sir John Lubbock will shortly issue, through the Messrs. Macmillan & Co., a work entitled "The Beauties of Nature and the Wonders of the World," uniform with his "Pleasures of Life."

— Messrs. Macmillan & Co. have in press, to be issued very shortly under American copyright, a long-expected "History of Early English Literature," by Rev. Stopford A. Brooke.